

What is claimed is:

1. A locking actuator comprising:

a piston adapted to be moved by a drive mechanism, the piston having a first end and a second end, the second end being adapted to link to an apparatus to be driven by the actuator, the piston defining a recess originating proximal the first end;

a strut having a base and a tip, the strut adapted to at least partially nest within the recess, the strut adapted to hold at least one locking mechanism proximal to the tip; and,

at least one locking mechanism held by the strut, the at least one locking mechanism adapted to move into a first position engaging the piston when the actuator is locked and adapted to move to a second position not engaging the piston when the actuator is unlocked.

2. The locking actuator of Claim 1, wherein the drive mechanism includes a first hydraulically pressurized cylinder adapted to move the piston.

3. The locking actuator of Claim 1, wherein the locking mechanism includes at least one locking key adapted to engage the piston when the actuator is locked.

4. The locking actuator of Claim 1, wherein the locking mechanism engages the piston when the piston is in an extended position.

5. The locking actuator of Claim 1, further comprising a shaft movably held within the strut, the shaft being adapted to move the locking mechanism between the first position and the second position.

6. The locking actuator of Claim 5, wherein the shaft defines a ramp proximal the tip of the strut, the ramp being adapted to move the locking mechanism between the first position and the second position.

7. The locking actuator of Claim 5, further comprising a second hydraulically pressurized cylinder linked to the shaft, the second hydraulic cylinder being arranged to move the shaft within the strut, such that the at least one locking key is moved between the first position and the second position.

8. The locking actuator of Claim 5, further comprising a spring arranged to bias the shaft, the spring being arranged to move the shaft within the strut, such that the at least one locking key is moved between the first position and the second position.

9. A locking actuator comprising:

5 a piston having a longitudinal axis with a first length, the piston having a first end and a second end, the first end being adapted to be moved by a drive mechanism and the second end being adapted to link to an apparatus to be driven by the actuator, the piston defining a recess originating at the first end and extending along the longitudinal axis, the recess having a second length less than or equal
10 to the first length, the piston further defining at least one groove projecting from the recess into the piston approximately perpendicular to the longitudinal axis, the at least one groove located proximal to the first end;

a strut having a base and a tip, the strut being adapted to project into the recess, the
15 strut being adapted to movably hold at least one locking key proximal to the tip; and at least one locking key movably held by the strut, the at least one locking key being adapted to move into a first position engaging the at least one groove when the actuator is locked and adapted to move to a second position not engaging the at least one groove when the actuator is unlocked.

20 10. The locking actuator of Claim 9, wherein the drive mechanism includes a first hydraulically pressurized cylinder surrounding the first end.

11. The locking actuator of Claim 9, further comprising a shaft movably held within the
25 strut, the shaft extending from proximal the base of the strut to proximal the tip of the strut, the shaft being adapted to move the at least one locking key between the first position and the second position.

12. The locking actuator of Claim 11, wherein the shaft defines a ramp proximal the tip
30 of the strut, the ramp being adapted to move the at least one locking key between the first position and the second position.

13. The locking actuator of Claim 12, wherein the ramp includes a top and a bottom, the top being adapted to hold the at least one locking key in the at least one groove when the
35 locking key is in the second position.

14. The locking actuator of Claim 11, further comprising a lever linked to the shaft, the lever being arranged to move the shaft within the strut, such that the at least one locking key is moved between the first position and the second position.

5 15. The locking actuator of Claim 11, further comprising:
a second hydraulic cylinder linked to the shaft, the second hydraulic cylinder arranged to move the shaft within the strut, such that the at least one locking key is moved between the first position and the second position.

10 16. The locking actuator of Claim 11, further comprising:
a spring arranged to bias the shaft, the spring arranged to move the shaft within the strut, such that the at least one locking key is moved between the first position and the second position.

15 17. A locking thrust reverser for aircraft comprising:
a thrust deflector incorporated with an aircraft engine and adapted to substantially reverse a thrust from the aircraft engine when the thrust deflector is in a deployed position, the thrust deflector being adapted to permit substantially forward thrust when the thrust deflector is in an undeployed position;
a piston incorporated with the aircraft engine, the piston having a longitudinal axis, a first end, and a second end, the first end being adapted to be moved by a drive mechanism and the second end being adapted to link to the thrust deflector, the piston defining a recess originating proximate the first end and extending at least partially along the longitudinal axis, the piston being adapted to position the thrust deflector in the undeployed position when the piston is moved by the drive mechanism into an extended position, and the piston being adapted to position the thrust deflector in the deployed condition when the piston is moved by the drive mechanism into a withdrawn position;
a strut having a base and a tip, the strut being adapted to substantially nest within the recess when the piston is in the withdrawn position, the strut being adapted to partially nest within the recess when the piston is in the extended position, the strut being adapted to hold at least one locking mechanism proximal the tip; and
at least one locking mechanism held by the strut, the at least one locking mechanism being adapted to move into a first position locking the piston when the piston is in the extended position and the thrust reverser is locked and adapted to move to a second position not locking the piston when the thrust reverser is unlocked.

20
25
30
35

18. The locking actuator of Claim 17, wherein the drive mechanism includes a first hydraulically pressurized cylinder surrounding the first end.

19. The locking actuator of Claim 17, further comprising a shaft movably held within the strut, the shaft extending from proximal the base of the strut to proximal the tip of the strut, the shaft being adapted to move the locking mechanism between the first position and the second position.

20. The locking actuator of Claim 19, wherein the shaft defines a ramp proximal the tip of the strut, the ramp being adapted to move the locking mechanism between the first position and the second position.

21. The locking actuator of Claim 19, further comprising a lever linked to the shaft, the lever being arranged to move the shaft within the strut, such that the locking mechanism is moved between the first position and the second position.

22. The locking actuator of Claim 19, further comprising a second hydraulically pressurized cylinder linked to the shaft, the second hydraulic cylinder being arranged to move the shaft within the strut, such that the locking mechanism is moved between the first position and the second position.

23. The locking actuator of Claim 19, further comprising a spring biasing the shaft, the spring being arranged to move the shaft within the strut, such that the locking mechanism is moved between the first position and the second position.

24. The locking actuator of Claim 17, wherein the locking mechanism includes at least one locking key adapted to engage the piston when the locking mechanism is in the first position when the actuator is locked, the at least one locking key being adapted to not engage the piston when the locking mechanism is in the second position when the actuator is unlocked.

25. The locking actuator of Claim 24, wherein:
the piston further defines at least one groove projecting from the recess into the piston approximately perpendicular to the longitudinal axis, the at least one groove being located proximal the first end; and
the at least one locking key being adapted to engage the at least one groove when the locking mechanism is in the first position when the actuator is locked and

adapted to not engage the at least one groove when the locking mechanism is unlocked.